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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/592,003	06/12/2000	Kevin M. McHugh	EGG-PI-612A1a	3578

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EXAMINER

LEYSON, JOSEPH S

ART UNIT

PAPER NUMBER

1722

DATE MAILED: 01/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/592,003

Applicant(s)

MCHUGH, KEVIN M.

Examiner

Joseph Leyson

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 03 October 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8, 16-24 and 32-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8, 16-24 and 32-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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1. In the amendment filed on 3 October 2002, the replacement paragraph, to the paragraph beginning on p. 1, lines 4-6, recites "08/322,032" which is incorrect. The examiner suggests deleting the replacement paragraph and replacing it with another wherein "08/322,032" is changed to --08/320,032--.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-8, 16, 17 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bowen et al.(-043) in view of Orme et al.(-360), Alvarez et al.(-853) and Garner et al.(-152).

Bowen et al.(-043) disclose a system for spray forming manufacture of an article including a heated spraying or atomizing nozzle 14c having a flow channel, the flow channel having an inlet end, an outlet end and a longitudinal axis, a pressurized heated liquid reservoir 14 (gas source S1; col. 3, line 44, to col. 4, line 7) in fluid communication with the nozzle flow channel, the reservoir 11 containing a liquid

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material capable of forming a mold, the nozzle 14c forming droplets directed to a chamber B containing a quench gas such as argon (col. 8, lines 24-47), the quench gas having a controlled temperature and composition for controlling the in-flight cooling of the droplets (col. 8, lines 24-56; col. 10, lines 17-34), means for directing and depositing the cooled atomized droplets onto a pattern 30 to form the article (col. 4, line 38, to col. 5, line 62), and means for providing relative movement between the nozzle and the pattern (col. 5, line 63, to col. 6, line 25). However, Bowen et al.(-043) does not disclose a nozzle as recited by the instant claims.

Orme et al.(-360: col. 2, lines 31-59) disclose that a deficiency in spraying forming is that the spray is for the most part uncontrolled. The droplets within the spray have a wide distribution of sizes and energies. And thus the smaller droplets may arrive at the surface pre-solidified (i.e., fully solidified), and there would be little cohesion between the particles in the deposit (i.e., little cohesion between the partially solidified droplets and the fully solidified droplets in the deposit).

Alvarez et al.(-853) disclose spraying or atomizing nozzles 100, 100a having flow channels with linear transverse cross-sectional geometries, the flow channels having inlet ends,

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outlet ends and longitudinal axes, a liquid material being injected through a conduit 3, 3a ending in the nozzle flow channel between the inlet and outlet ends and proximate to the nozzle longitudinal axis, and means for flowing a high temperature atomizing gas, such as argon, nitrogen, helium, neon and air (col. 2, lines 56-62), at a flow velocity of supersonic velocities through the nozzle flow channel from the inlet end to the outlet end to atomize the liquid injected into the flow channel into a plume of atomized droplets (col. 3, lines 51-57). The nozzle flow channel converges to a choke portion located between the inlet end and the outlet end, and diverges between the choke portion and the outlet end (see figs. 1 and 2). The liquid material is injected into the nozzle flow channel proximate to the longitudinal axis between the choke portion and the outlet portion (see fig. 1) or between the inlet end and the choke portion of the flow channel (see fig. 2). The nozzle may have multiple separate liquid inlets into the flow channel (col. 3, lines 13-16). The nozzles apply to forming metal powders (col. 1, lines 40-43, i.e., gas atomization of metal) and form a spray of substantially uniform droplet size (i.e., col. 1, lines 13-17; col. 2, lines 15-24).

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Garner et al.(-152) disclose a spray forming system for making a mold by spraying metal around a pattern (i.e., see abstract).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the system of Bowen et al.(-043) by replacing its spraying or atomizing nozzle with the spraying or atomizing nozzle of Alvarez et al.(-853) because the nozzle of Alvarez et al.(-853) would provide an alternative configuration for spraying or atomizing liquids to form a spray of directed droplets, which configuration is capable of providing a spray of substantially uniform droplet size and thus overcome the deficiency in spray forming of wide droplet size distribution as recited by Orme et al.(-360), and to modify the system of Bowen et al.(-043) such that the article is a mold because a mold is an article that can be made by spray forming as disclosed by Garner et al.(-152). Note that Orme(-360) discloses that spraying forming has both benefits and deficiencies (col. 2, lines 31-34) and that one of the deficiencies is that droplets within the spray have a wide distribution of sizes and energies (i.e., non-uniform droplets), as mentioned above. Alvarez et al.(-853) discloses a novel spraying or atomizing nozzle which produces a spray of substantially uniform droplets. Thus, an artisan of ordinary

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skill in the art at the time of the invention would be motivated to replace the spray nozzle of Bowen et al.(-043) with the spray nozzle Alvarez et al.(-853) with a reasonable expectation of success that the UNIFORM DROPLET nozzle of Alvarez et al.(-853) would overcome some of the deficiencies of the NON-UNIFORM DROPLET nozzle of Bowen et al.(-043). Note that even Alvarez et al.(-853: col. 1, lines 46-48) discloses "Many processes can be improved, however, where a uniform droplet size distribution is required in a specific size range."

4. Claims 18-24, 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bowen et al.(-043) in view of Orme et al.(-360), Alvarez et al.(-853) and Garner et al.(-152) as applied to claims 1-8, 16, 17 and 34 above, and further in view of Ashok et al.(-752).

Bowen et al.(-043), Orme et al.(-360), Alvarez et al.(-853) and Garner et al.(-152) are applicable as mentioned above.

Ashok et al.(-752) disclose a spray forming system including a plurality of nozzles for spraying incompatible liquids (fig. 3; col. 5, lines 44-50) to form an article of incompatible liquids.

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to further modify the system to have multiple nozzles because a plurality of nozzles

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would enable the system to make an article made of incompatible liquids as recited by Ashok et al.(-752).

5. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bowen et al.(-043) in view of Orme et al.(-360), Alvarez et al.(-853) and Garner et al.(-152) as applied to claims 1-8, 16, 17 and 34 above, and further in view of Rotolico et al.(-225).

Bowen et al.(-043), Orme et al.(-360), Alvarez et al.(-853) and Garner et al.(-152) are applicable as mentioned above.

Rotolico et al.(-225) disclose a spray forming system which sprays liquid particles with solid particles to form a composite article (i.e., see abstract).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to further modify the system by feeding liquids with solid particles to the nozzle because such a modification is known in the spray forming art and would produce a composite article as disclosed by Rotolico et al.(-225).

6. Applicant's arguments filed 3 October 2002 have been fully considered but they are not persuasive.

Applicant argues that the examiner has not established a prima facie case of obviousness because there is no suggestion for the proposed combination. The examiner recognizes that



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obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the teaching, suggestion, or motivation to combine the references are in the references themselves. Applicant argues that the examiner only states "because the nozzle of Alvarez et al.(-853) would provide an alternative configuration" which does not provide any explanation of why such a proposed combination would be obvious. However, this quotation is only a portion of the teaching, suggestion, or motivation in the rejections by the examiner. Again, the proposed prior art combination would be obvious because the nozzle of Alvarez et al.(-853) would provide an alternative configuration, for the nozzle of Bowen et al.(-043), capable of spraying or atomizing liquids with UNIFORM DROPLETS which would overcome a known deficiency in the art (i.e., NON-UNIFORM DROPLETS) as disclosed by Orme et al.(-360).

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on

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obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In this case, the prior art rejections cite knowledge from the references themselves, as shown by the column and line citations, and do NOT include knowledge gleaned only from applicant's disclosure.

Applicant argues that Orme et al.(-360) teaches away from the proposed combination of prior art and actually demonstrates a secondary consideration that spray forming technologies cannot be operated in a controlled environment. The examiner agrees with applicant that Orme et al.(-360) discloses that uniform droplet size is a disadvantage of spray forming and that uniform droplet size does not appear to be achievable using spray forming technologies. However, Orme et al.(-360) does NOT disclose the ultimate conclusions that spray forming technologies CANNOT be operated in a controlled environment or that uniform droplet size CAN NEVER be achievable using spray forming technologies. Clearly, Orme et al.(-360) teaches away from any combination wherein the nozzle provides NON-UNIFORM

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droplets. However, Alvarez et al.(-853) provides UNIFORM droplets. Orme et al.(-360) suggest that nozzles providing uniform droplets are preferable and thus suggest toward the proposed combination.

7. The Declaration of Kevin M. McHugh under 37 CFR 1.132 filed 3 October 2002 has been considered by the examiner and is insufficient to overcome the prior art rejections of the instant claims.

Dr. McHugh states that there is no motivation for the proposed combination of Bowen et al.(-043) with Alvarez et al.(-853) because Bowen et al.(-043) desires to maintain a low spray chamber pressure to provide a higher temperature of the atomized spray whereas the subject invention actually seeks the rapid in-flight cooling of the atomized droplets. The examiner agrees that Bowen et al.(-043) discloses that low gas partial pressure in the spray chamber provides a higher temperature of the atomized spray. However, a higher temperature of the atomized spray does not necessarily negate rapid in-flight cooling of the atomized droplets. Further, Dr. McHugh has not stated why the proposed combination would not provide rapid in-flight cooling of the atomized droplets. Note that spray casting, including Bowen et al.(-043), inherently has rapid in-flight cooling to enable the droplets to splat on the deposit. Furthermore, the

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instant claim language does NOT require rapid in-flight cooling of atomized droplets as a positive limitation of the instant claims. The quench gas having a controlled temperature and composition for controlling the in-flight cooling of the atomized droplets, as recited by the instant claims, does not positively require rapid in-flight cooling of the atomized droplets.

Dr. McHugh states that the proposed modification of the prior art would actually render the system of Bowen et al.(-043) undesirably inoperable, since such a modification would not reduce deposit porosity, reduce grain layering or banding, or provide uniform grain structure through the thickness as desired by Bowen et al.(-043). However, such a statement is a conclusory statement without any factual basis. The examiner assumes that the basis for the statement is again that Bowen et al.(-043) desires to maintain a low spray chamber pressure to provide a higher temperature of the atomized spray whereas the subject invention actually seeks the rapid in-flight cooling of the atomized droplets. However, Dr. McHugh has not provided any evidence why the proposed combination would require rapid in-flight cooling of the atomized droplets, and has not provided any evidence to support a conclusion that rapid in-flight cooling of the atomized droplets would NOT reduce deposit

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porosity, reduce grain layering or banding, or provide uniform grain structure through the thickness, as desired by Bowen et al.(-043).

Dr. McHugh states that since Orme et al.(-360) identifies what he considers to be a disadvantage of spray forming technologies, one skilled in the art would not be motivated to combine the techniques in Orme et al.(-360) with any spray forming technology. However, the prior art rejections do NOT combine the techniques in Orme et al.(-360) with any spray forming technology. Orme et al.(-360) is used in the prior art rejections to show what artisans of ordinary skill at the time of the invention know about spray casting technology. The examiner agrees that Orme et al.(-360) discloses that smaller droplets may arrive at the surface pre-solidified. Dr. McHugh states that it should be appreciated by the examiner that the relatively cold ambient gas of the present invention, provides a heat sink for the atomized droplets, produces droplet populations in undercooled, liquid, solid and semi-solid states. The examiner agrees that real world spray casting droplet populations will include undercooled, liquid, solid and semi-solid states, as even disclosed by Orme et al.(-360), with the goal of statistically keeping undesired populations low and desired populations high to improve the product. The proposed

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combination would enable more UNIFORM droplets to be formed, thus reducing the population of smaller droplets which may arrive at the surface pre-solidified.

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Leyson whose telephone number is (703) 308-2647. The examiner can normally be reached on M-F(8:30-6:00) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wanda Walker can be reached on (703) 308-0457. The fax phone numbers for the

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organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

*jl*

jl

January 13, 2003

*James Mackey*  
**JAMES P. MACKEY**  
**PRIMARY EXAMINER**

*1/13/03*